Agent-Based Collaborative Traffic Flow Management, Phase I

Completed Technology Project (2010 - 2010)

Project Introduction

We propose agent-based game-theoretic approaches for simulation of strategies involved in multi-objective collaborative traffic flow management (CTFM). Intelligent agents represent two types of entities / players: FAA Traffic Management Unit (TMU) representatives, and Airline Operations Center (AOC) coordinators. The software modules resulting from this work are intended to be part of the NASA ARC multi-agent simulation toolkit for CTFM. The goal is to utilize game theory to understand the behavior of AOCs so that the CTFM system may be designed to yield improved performance of the NextGen AirSpace without compromising safety. We consider a spectrum of information sharing cases, from complete information sharing to incomplete information sharing where AOCs limit the transparency of their strategies to the FAA TMU. This agent-based simulation software will enhance the ability of the FAA (and other parties including NASA) to design proper collaboration protocols and incentives by studying the effects of different strategies by both types of players. We call this a "co-opetition" simulation tool since it allows analysis of competitive strategies between AOCs, while providing insights into how the TMU can promote greater cooperation by the AOCs for the common good. We should emphasize that the intent of the proposed software is NOT to design effective AOC strategies since that will be determined by the individual airlines, and not the CTFM system designers.

Primary U.S. Work Locations and Key Partners

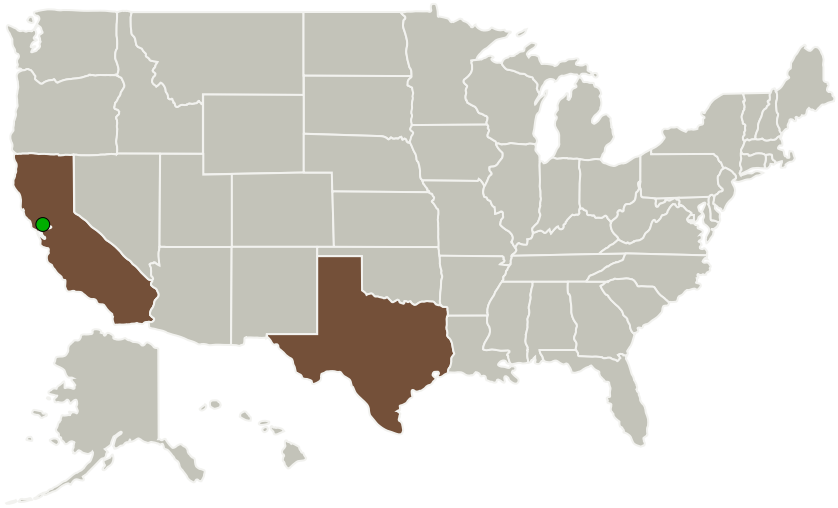

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Table of Contents

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
Vcrsoft, LLC	Lead Organization	Industry Minority-Owned Business	Arlington, Texas
Ames Research Center(ARC)	Supporting Organization	NASA Center	Moffett Field, California

Primary U.S. Work Locations	
California	Texas

Project Transitions

January 2010: Project Start

July 2010: Closed out

Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/138810)*

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Vcrsoft, LLC

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

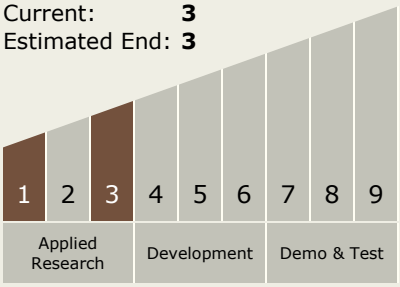
Carlos Torrez

Principal Investigator:

Vc Ramesh

Technology Maturity (TRL)

Start: **1**
Current: **3**
Estimated End: **3**



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Technology Areas

Primary:

- TX16 Air Traffic Management and Range Tracking Systems
  - TX16.3 Traffic Management Concepts

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System